Basic Psychology

Ethology

- Konrad Lorenz, Nicholaas Tinbergen
- behaviour is best studied comparatively, under natural conditions
- behaviour is a result of genes and environment
- innate behaviour is a complex sequence of responses – a *fixed action pattern* – which is triggered by a *sign stimulus* or releaser
- fixed actions patterns include:
  - smiling
  - brow flash response
  - expressions of joy, anger, fear, disgust
- fixed action patterns do not require previous learning for expression
- *critical period*
- *imprinting*

Learning

Classical Conditioning (Respondent Learning)

- Pavlov, 1920
- a procedure in which a neutral stimulus is repeatedly paired with a stimulus that already triggers a reflexive response until the previously neutral stimulus alone provokes a similar response:

1. UCS (meat powder) ----------→ UCR (salivation)
2. Neutral stimulus (tone) ----------→ orienting response
3. Neutral stimulus (tone) + UCS ---------→ UCR (salivation)
4. CS (tone) ----------→ CR (salivation)

- subject is passive
- responses are typically autonomic or emotional
- continued pairings of a CS with UCS **strengthen** conditioned responses

Essential concepts

Extinction: if the UCS is no longer paired with the CS, the conditioned response becomes weaker and eventually disappears; occurs when the conditioned stimulus is given in the absence of the unconditioned stimulus
- can recover CS-CR link if:
  a) repeat pairing of UCS
  b) allow respite period without presenting CS (spontaneous recovery)

Spontaneous Recovery: after extinction, the conditioned response often reappears if the CS is presented after some time - this is *spontaneous recovery* or *partial recovery*

SHOUT
SHARE
IT

- it is less strong than the CR
- the longer the time between extinction and reappearance of the CS, the stronger the response

Reconditioning: is the quick recovery of the CR after extinction

- if the conditioned and unconditioned stimuli are paired once or twice after extinction, *reconditioning* occurs; that is, the CR reverts to its original strength

Stimulus Generalisation: conditioned responses occur to stimuli that are similar but not identical to conditioned stimuli (e.g. fear of dogs > fear of fur)

- usually requires a dozen trials
- CR diminishes proportionally according to the extent new CS differs from orignal CS

Stimulus Discrimination: allows some stimuli to prompt a conditioned response but not others; limits generalisation

The Signaling of Significant Events

- organisms acquire conditioned responses when one event reliably *signals* the other
- classical conditioning works best when the CS precedes the UCS
  - this is known as *forward conditioning*
  - backward and simultaneous conditioning are slow
- a CR develops best if the interval between CS and UCS is no more than about one second (Ross & Ross, 1971)
- the strength of a CR and the speed of conditioning increase as the intensity of the UCS increase
- **second-order conditioning** occurs when a CS becomes powerful enough to make CSs out of stimuli associated with it.
  - stimuli (such as the appearance of a white coat) that precede the UCS (which may be a painful injection) can become a CS for the fear response
  - possible model for acquisition of phobias
- organisms seem to be biologically prepared to learn certain associations e.g. *taste aversions*
  - this is known as *biopreparedness*
  - taste aversions violate the usual timing of classical conditioning
- to meet real life findings in humans, the theory must include the concepts of:
  - **incubation**: increase in strength of emotional CR as consequence of repeated brief exposure to CS
  - **preparedness**: some stimuli are more likely to become CS than others

Delayed conditioning

- onset of CS precedes that of UCS, and the CS continues until the response occurs

Simultaneous conditioning

- onset of both stimuli is simultaneous
- less successful than delayed conditioning

Trace conditioning

- CS ends before the onset of the UCS, and the conditioning becomes less effective as the delay between the two increases

Some applications of classical conditioning

1. Learned immune responses (Ader & Cohen, 1993)
2. Phobias
3. Systematic desensitization (Joseph Wolpe)
4. Predator Control

Little Albert (Watson and Rayner, 1920)

- experimental induction of phobia using classical conditioning
- used an 11-month-old boy
- white rat + loud noise resulted in the eventual fear of the rat without the noise
- this fear generalised to any furry animal

Opponent-Process Theory

- Solomon (1980)
- *habituation* is the result of a relatively automatic, involuntary A-Process (essentially an *unconditioned response*, e.g. drug effect) and a *conditioned* B-Process that follows and counteracts the A-Process
- this theory may explain drug tolerance and some cases of drug overdose

Instrumental and Operant Conditioning

The Law of Effect: (Edward Thorndike)

- holds that any response that produces satisfaction becomes more likely to occur again and any response that produces discomfort becomes less likely. He called this type of learning **Instrumental Conditioning** – responses are strengthened when they are *instrumental* in producing rewards
- The repetition of behaviour increases the likelihood of its recurrence (*habit strength*).

Operant Conditioning: (B. F. Skinner, 1938)

- the organism is free to respond at any time, and conditioning is measured by the rate of responding – the organism learns a response by *operating on* the environment

- subject is active
- likely to be using consciously controlled behaviours
- stimulus generalization, discrimination, extinction and spontaneous recovery also occur in operant conditioning

Basic Components of Operant Conditioning

- an **operant** is a response that has some effect on the world
- a **reinforcer** increases the probability that the operant preceding it will occur again
    - **positive reinforcers** strengthen a response if they are experienced after that response occurs – equivalent to *rewards*
    - **negative reinforcers** strengthen a response if they are removed after it occurs – e.g. pain, or threats of punishment

- both *escape conditioning* and *avoidance conditioning* are the result of negative reinforcement
- **escape conditioning** results when behaviour terminates a negative reinforcer (e.g. a dog in a shuttle box escaping an electric shock)
    - it learns to make a response to an aversive stimulus
    - very resistant to extinction
- **avoidance conditioning** results when behaviour avoids a negative enforcer; it reflects both classical and operant conditioning
    - the organism learns to respond to a signal (e.g. light) that avoids the aversive stimulus
    - examples include stopping at a red light, or going to work when we don't really want to
- behaviours learned through avoidance conditioning are very resistant to extinction – they are often reinforced by *fear reduction*
- **discriminative stimuli** indicate whether reinforcement is available to a particular behaviour

Forming and Strengthening Operant Behaviour

- **shaping** involves reinforcing successive approximations of the desired response
    - utilizes operant conditioning
    - e.g. training circus animals
- **primary reinforcers** are inherently rewarding (e.g. food, sex)
- **secondary reinforcers** are rewards that people or animals learn to like because of their association with primary reinforcers (e.g. money - its reinforcing power lies in its association with the rewards it can bring, or smiles and encouragement)
    - they are effectively *conditioned reinforcers*
- the speed of conditioning is proportional to the size of reinforcer
- reinforcement may be delivered on the following schedules:

1. **continuous reinforcement schedule:** a reinforcer is delivered every time a particular response occurs
2. **partial/ intermittent reinforcement schedule:** reinforcement is delivered only some of the time:
    - **Fixed-ratio (FR) schedules:** reinforcement follows a fixed number of responses
        - **‘**post-reinforcement pause’
    - **Variable-ratio (VR) schedules:** reinforcement again follows a fixed number of responses, but that number varies from one reinforcement to the next. e.g. gambling - pays off after an unpredictable number of lever pulls, averaging one in twenty (= VR20 schedule)
        - more likely to produce emotional outbursts during the learning phase
        - less likely to produce emotional outbursts during the extinction phase
    - **Fixed-Interval schedules (FI):** provide reinforcement for the first response that occurs after some fixed time has passed since the last reward, regardless of how many responses have been made during that interval (e.g. you can’t win more than twice in a day competition)
    - **Variable-interval (VI):** reinforce the first response after some period of time, but the amount of time varies (e.g. police stopping drivers at random and awarding prizes to those who had their seat-belts on)

- in general, the rate of responding is higher under ratio schedules then under interval schedules
- the unpredictable timing of rewards generates slow, but steady responding
- the curve of speed of learning against time is smooth for variable interval or variable ratio schedules, and scallop-shaped for fixed schedules
    - in fixed interval schedules, there is an increase in responding as the time for reinforcement draws near, and a decrease in the rate of response just after reinforcement
- behaviour learned through partial reinforcement, particularly through variable schedules, is very resistant to extinction; this is called the **partial reinforcement extinction effect**

- partial reinforcement is involved in *superstitious behaviour*, which results when a response is coincidentally followed by a reinforcer – this is an example of *accidental reinforcement* (e.g. lucky shirt)

	Variable	**Fixed**	**Ratio**	**Interval**
Shape of curve	Smooth	Scallop-shaped		
Rate of response			High	Low

Punishment and Learning

- **Punishment** decreases the frequency of a behaviour by following it either with and unpleasant stimulus or with the removal of a pleasant one (then it is known as a **penalty**). It has several drawbacks:

1. it only suppresses behaviour (e.g. children will repeat punished acts if they think they can avoid detection)
2. fear of punishment may generalize to the person doing the punishing
3. it is ineffective when delayed. If a child confesses to wrongdoing and is then punished, the punishment may discourage honesty rather than eliminate undesirable behaviour
4. it can be physically harmful
5. it may teach aggressiveness
6. it teaches only what not to do, not what should be done to obtain reinforcement

- reinforcement *strengthens* behaviour; punishment *weakens* it. e.g. if a shock is *turned off* when a rat presses a lever, that is negative reinforcement; if a shock is *turned on* when the rat presses the lever, that is punishment; the rat will be less likely to press the lever again
- punishment is most effective when:
    1. it is immediate
    2. it is of sufficient intensity to suppress response on first occasion rather than starting with low intensity
    3. it is specified why punishment is being given and that the behaviour, not the person, is being punished
    4. more appropriate responses are identified and positively reinforced (**Differential Reinforcement of Other behaviour: DRO**)

Clinical relevance

- **shaping**: reinforcement of successive approximations to desired/ effective behaviour
    - occurs when complete response is complex

    - used in teaching and is accompanied by instruction, prompting, and encouragement
    - used in learning disability
- **chaining**: breaking complex behaviour into sequence of steps
    - the first act in a series is reinforced until it can be performed reliably, then the contingencies are altered so that the previous steps have to be performed before reinforcement is given, and so on
    - in *backward chaining*, the satisfaction of achieving the desired final links in the chain provides additional reinforcement for the learning of successively earlier links (e.g. toilet training)

Cognitive Processes in Learning

- **Learned Helplessness** (Seligman & Maier, 1967) appears to result when people believe that their behaviour has no effect on the world. People, like animals, tend to make less effort to control their environment when prior experience leads them to expect those efforts to be in vain. People can develop effort-reducing expectations either through personal experience or through being told they are powerless
    - the original experiments used dogs
- Both humans and animals display **latent learning** - learning that is not evident when it first occurs
- they form **cognitive maps** of their environment which develop naturally through experience, even in the absence of any overt response or reinforcement – demonstrated by Tolman, 1920s with rats in mazes
- Köhler's experiments on **insight** suggest that cognitive processes play a role in learning, even in animals. Insight may result from a 'mental trial and error' process.

Observational Learning

- learning by watching others - **observational learning**, or **social learning** - is efficient and adaptive
- children are particularly influenced by the adults and peers who act as **models** for appropriate behaviour in various situations (c.f. Albert Bandura's experiment with nursery school children who witnessed varying levels of aggression towards a doll, and modified their subsequent behaviour accordingly)
- children who saw adults rewarded for aggression showed the most aggressive acts in play; they had received **vicarious conditioning**, a kind of observational learning in which one is influenced by seeing or hearing about the consequences of others' behaviour
- 5 functions in observational learning:
    1. attention to relevant aspects of model's behaviour
    2. visual image of model
    3. remembering/ rehearsal of behaviour
    4. refinement by reproduction of learned behaviour
    5. anticipation of consequences
- optimum conditions:
    1. subject sees the behaviour being reinforced

2. *perceived similarity* – subject believes they can emit the response necessary to obtain reinforcement

Active Learning

- these methods take various forms and encourage people to think deeply about and apply new information instead of just memorizing isolated facts
- e.g. small-group problem-solving tasks, discussion of mini-essays, and MCQs that give students feedback on the previous 15 minutes of teaching

Skill Learning

- observational learning, **practice** (the repeated performance of a skill), and **corrective feedback** play important roles in the learning of skills
- practice should continue past the point of correct performance until it is automatic

Sign learning theory

- to explain how familiarity with a maze helps learning how to run it
- formation of **cognitive maps** which are expectations about what will happen next

Insight learning

- rapid restructuring of perceptual field or concept to derive sudden insight into a problem
- learning of a cognitive relationship between means and end

Social learning theory

- based on work by Albert Bandura
- originally applied to attempts to integrate psychoanalysis and learning theory – tends to focus on nurture rather than biological factors
- Conceptualizes people as active, thinking, problem solvers who learn by a variety of mechanisms and whose learning is affected by such factors as *cognitive appraisal, inference, goal seeking, affiliation, striving for meaning*, etc.
- includes *desensitization*

Perception

- according to the **ecological view** of perception, most of what we perceive is already present in the rich array of stimuli in the environment
    - the primary goal of perception is to *support actions* such as walking or driving
- the **constructionists** argue that the perceptual system must construct a representation of reality from fragments of sensory information
- the **computational** view explains how complex computations within the nervous system might turn raw sensory stimulation into a representation of the world

Psychophysics

Absolute thresholds

- the minimum detectable amount of physical energy (light, sound, pressure, etc.) is called the *absolute threshold*
- because of variability, psychophysicists have redefined the absolute threshold as the minimum amount of energy that can be detected 50 % of the time
- variability arises from:
    1. **internal noise** is the spontaneous, random firing of cells in the nervous system that occurs in varying degrees whether or not we are stimulated by physical energy
    2. the **response criterion** (a.k.a. *bias*) reflects a person's willingness or reluctance to respond to a stimulus and is affected by:
        - *motivation*
        - *expectancies*

Difference threshold

- minimum difference that has to exist between two sources for them to be perceived separately

Signal detection theory

- **signal detection theory** is a mathematical model of how people's sensitivity and response criterion combine to determine decisions about whether they say that a near-threshold stimulus has occurred
- **sensitivity** refers to one's ability to discriminate a stimulus from its background
- the theory explains:
    - detecting cancer cells in a pap smear
    - spotting a weapon in an airport x-ray

Weber's Law (Ernst Weber)

- states that the smallest detectable difference in stimulus energy is a constant fraction of the intensity of the stimulus

- the smallest detectable difference in the stimulus is called the **difference threshold** or **just-noticeable difference (JND)**
- e.g. noticing a 50 p difference in change from a £ 1 bus fare, but not noticing a 50 p difference in the monthly rent (since it is below the JND)
- does not hold when stimuli are very intense or very weak

Fechner's Law (1860)

- as stimulus magnitude increases, larger and larger changes in physical energy are necessary to obtain equal changes in *perceived* magnitude – sensory perception is a logarithmic function of stimulus intensity
- i.e. constant increases in physical energy will produce progressively smaller increases in perceived magnitude
- applies to most, but not all, stimuli - e.g. does not apply to an electric shock, which takes less and less energy to increase the perceived intensity

Perceptual organization

Figure and ground

- when you look at a complex scene or listen to a noisy environment, some stimuli are emphasized and stand out clearly (**figure**) and others are perceived to be less relevant background (**ground**)
    - e.g. you see a person standing in front of building, not a building with a person-shaped whole in it
- the effect is known as **figure-ground differentiation**
- e.g. vases/ faces picture demonstrates reversal of figure and ground
- camouflage demonstrates blurring of figure and ground

Grouping

- certain inherent properties of the stimulus environment lead people to group them together, more or less automatically
- the **Gestalt psychologists** argued that people perceive sights and sounds as organized wholes - the whole is greater than the sum of its parts
- most perceptual phenomena demonstrate Gestalt effects
- they proposed a number of principles that describe how the perceptual system organizes stimuli:
    1. **proximity** - the closer objects or events are to one another, the more likely they are to be perceived as belonging together
    2. **similarity** - similar elements are perceived to be part of a group, even if separated
    3. **continuity** - sensations that appear to create a continuous form are perceived as belonging together
    4. **closure** - people tend to fill in missing contours to form a complete object
    5. **texture** - when basic features of stimuli have the same texture, those stimuli are grouped together
    6. **simplicity** - people tend to group features of a stimulus in a way that provides the simplest interpretation of the world

7. **common fate** - sets of objects that are moving in the same direction at the same speed are perceived together (e.g. flock of birds)
8. **common region** - elements located within the same boundary tend to be grouped together

Auditory scene analysis

- through closure, we hear a tone as continuous even if it is repeatedly interrupted by bursts of static
- **auditory scene analysis** is the perceptual process of mentally representing and interpreting sounds
- sounds with similar characteristics are grouped into separate *auditory streams* which are sounds perceived as coming from the same source

Perception of depth, distance, and motion

Depth & distance perception

- made possible by *stimulus cues* - characteristics of visual stimuli and therefore illustrate the *ecological view* of perception:
    1. principle of **relative size** - the object producing the larger image on the retina is perceived to be closer
    2. **height/ elevation** - more distant objects are usually higher in the visual field
    3. **interposition** (a.k.a. *occlusion*) - closer objects block the view of things further away
    4. the apparent convergence of parallel lines is **linear perspective** - the closer together two converging lines are, the greater the perceived distance
    5. since greater distances usually produce less clarity, **reduced clarity** is interpreted as a cue for greater distance
    6. **light and shadow** - brighter objects are perceived as being nearer
    7. a **textural gradient** is a graduated change in the texture of a visual field - texture appears less detailed as distance increases
    8. **movement gradient** (a.k.a. *motion parallax*) is the difference in the apparent movement of objects - objects closest to you move faster than distant objects

- depth and distance perception are abnormal in:
    - schizophrenia
    - temporal lobe epilepsy
    - derealization
    - acute brain syndromes

Cues based on properties of the visual system

- **accommodation** produces information about muscle activity, which helps to create the perception of distance
- **convergence** - the closer the object, the more the eyes must converge, and the greater the proprioceptive information going to the brain
- the difference between the two retinal images of an object is called **binocular disparity** - the disparity decreases with increasing distance

- a similar principle underlies location of an auditory stimulus

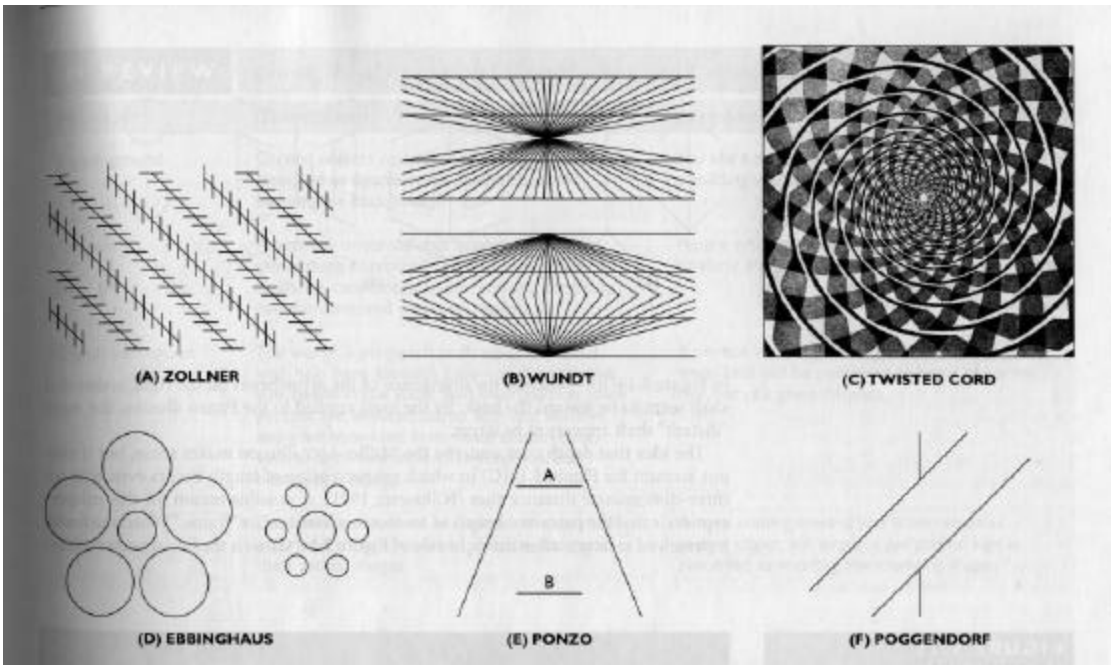
Perception of motion

- not due to movement of retinal image (which has to move or *habituation* renders it invisible)
- brain differentiates between pursuit and searching eye movements (? Action at superior colliculus)
- **looming** is the rapid expansion in the size of an image so that it fills the retina - when an image looms, there is an automatic tendency to perceive it as an approaching stimulus
- if the expansion is as fast to the right as to the left, and as fast as above as below, this signals that the object is approaching the eyes and we duck!
- relatively large objects are assumed stationary (e.g. moon and clouds)
- motion aftereffects show spatial frequency specificity
- perception of apparent motion depends on interstimulus interval
- the magnitude and pattern of texture moving across the retina provide a cue to your speed and to whether you are accelerating

Perceptual constancy

- experience of a consistent world in spite of incomplete, ambiguous, confusing sensory information; often lost in schizophrenia
- **size constancy:** approaching object produces increasingly large retinal image but does not appear to grow - objects retain size regardless of distance (*constancy scaling*)
    - people are better at judging the true size and distance of familiar objects
    - may explain why small cars have more accidents than large ones in countries where cars vary greatly in size
- **shape constancy:** e.g. window perceived as rectangle in spite of non-rectangular and varying retinal image
    - in Western countries, most corners are at right angles, and most curved surfaces are circular or spherical
- **brightness constancy:** white paper in dim light and grey paper in bright light retain colours in spite of overlap in amount of light reflected
- **colour constancy:** similar retention of colour in differing coloured illumination
- **location constancy:** spatial position is constant regardless of viewer's movement

Perceptual illusions



- Ponzo Illusion - can be explained by a misapplication of size constancy and the depth cue of linear perspective
- Müller-Lyer Illusion - represents a misapplication of the depth cue of linear perspective
- Ebbinghaus illusion - similar to the misjudgment of brightness
- visual illusions suggest an *active striving after meaning*
    - reproduce completely in drawings what is present visually but not experienced by touch (e.g. front parts of bus omitted but access platform at the rear is included)
    - maintain perceptual constancy for size and shape

Mechanisms of pattern recognition

- matching of stimulus to template acquired by learning/ experience does not allow for generalization
- possibility of *abstractions* (prototypes) generated by comparisons and categories of stimuli but context not accounted for
- feature recognition followed by feature combination and ultimately pattern recognition

Top-down processing

- knowledge of the world and experience in perceiving allow people to make inferences about the identity of stimuli, even when the quality of raw sensory information is low

- for example, a small, dark, moving shape at the end of a leash is perceived as a dog, because the stimulus occurs at a location where we would expect a dog to be
- motivation can also affect perception

Bottom-up processing

- raw sensory information is analyzed into basic features, such as colour or movement
- these features are then recombined at higher brain centres, where they are compared to stored information about objects or sounds
- for example, you recognize a dog because it has 4 legs, a tail, and is barking, and it matches your perceptual category for 'dog'

Network, or PDP (parallel distributed processing)

- recognition depends on communication among feature-analysis systems operating simultaneously and enlightened by past experience
- for example, a dog standing behind a picket fence will look like a dog, even though each 'slice' may not look like a dog

Perceptual set

- a **perceptual set** is the readiness or predisposition to perceive a stimulus in a certain way
- demonstrates top-down processing
- expectancy may also be shaped by the *context* in which the stimulus occurs
- emotional connotations e.g. *perceptual defence*
- individual values e.g. poor children exaggerate size of coins
- personality characteristics may also predict the kinds of top-down processing that people engage in (*field dependence*)

Information theory

- can extract information from sensory stimuli and form hypotheses about the world e.g. reading using only the tops of letters, or some rather than all words in a text
- sensory input contains *redundant* information
- *chunking* of information facilitates processing
- grouping information into aggregations according to attributed meaning

Perception and Human Development

- **habituation** - infants stop looking when they repeatedly see stimuli that are perceived to be the same
- if a stimulus appears that is perceived to be different, looking resumes - this is **dishabituation**

Learning vs. innate in perception

- neonates capable of levels of brightness discrimination, can track, have slightly impaired visual acuity (6:50) and fixed focus (20 cm)
- 2/12: depth perception (as tested with the *visual cliff*)
- 4/12: colour vision, accommodation

- 6/12: acuity is 6:6
- preference for complex stimuli

- in blindness from birth, which has been corrected surgically, the subject can:
    - fixate, track, scan
    - distinguish figure from ground
- but not able immediately to:
    - identify visually objects previously known by touch

- the following functions are believed to be *innate*:
    - visual scanning
    - tracking
    - fixating
    - figure ground discrimination

Attention

- attention is the process of directing and focusing certain psychological resources to enhance perception, performance, and mental experience
- three important characteristics:
    1. *improves mental processing* -
    2. attention takes *effort*
    3. attentional resources are *limited*

- shifting attention involves:
    1. *overt orienting* - pointing sensory systems at a particular stimulus e.g. looking behind you
    2. *covert orienting* - e.g. able to shift attention to an image of a friend's face without moving a muscle

Types of attention

1. Selective/ Focused
2. Divided
    a) two sources are attended to simultaneously
3. Sustained
    a) the environment is monitored constantly
4. Controlled
    a) effort is required
5. Automatic
    a) little conscious effort is required
    b) *Stroop effect*: the automatic process is so ingrained that it interferes with controlled processing

- *Dual-task interference*: refers to the loss of performance occurring during divided attention

Memory

- retention of:
    - learned associations
    - stored information
    - skills

Basic Memory Processes

1. **encoding**
    a) *visual codes*
    b) *acoustic codes*
    c) *semantic codes*
    d) the **dual-coding theory** suggests that information is remembered better when it is represented in both a visual and semantic code
2. **storage**:
    a) sense organ memory
    b) short term memory
    c) long term memory:
        i) *episodic* (memories of specific events)
        ii) *procedural* (the memory of how to do things)
        iii) *semantic* (generalized knowledge about the world)
3. **retrieval:**
    a) recall
    b) recognition

Explicit and Implicit memory

- **explicit memory** are the processes through which people try to remember something, such as details of ones last holiday - you have subjective temporal awareness of the information
    - relies on the medial temporal lobes
- **implicit memory** is the unintentional recollection and influence of prior experiences. It operates automatically and without conscious effort – you have no awareness of the source
    - relies on cerebellum, amygdala
    - learning usually requires repetition
    - learnt relatively slowly

The Three Levels of Memory

1. Sensory memory

- allows comparison of stimulus with LTM to assign significance
- *echoic* (auditory) or *iconic* (visual)
- fade/ loss time about 0.5 secs

2. Short-term (primary/ working) memory

- item entering STM will be lost in about 18 seconds (Brown-Peterson procedure) unless *rehearsal/ repetition* which is typically verbal
- conscious of store contents
- capacity of about 7 ± 2 items
    - can increase by *chunking* of information to allow one entry to cover several items
    - chunking by imposing *meaning* or *rule*
- may be several subsystems:
    - recent auditory input
    - recent visual input
    - recent speech/ motor output etc.
    - verbal in left hemisphere
    - visual in right hemisphere
- information coded visually fades more quickly
- transfer of selected STM contents to LTM, remainder lost
- retrieval is effortless and error free
- affected by:
    - *primacy*
    - *latency*
    - *serial position* – items in the middle of a list are more likely to be lost

3. Long-term (secondary memory)

- not conscious of store
- may be limitations on retrieval i.e. 'available' but not 'accessible'
- requires **consolidation**: once information is stored in LTM, it must be left undisturbed for a few minutes
    - may be speeding by caffeine
    - major disruption (ECT/ head injury) induces *retrograde amnesia*
- coding is mainly visual, semantic, acoustic
- information stored systematically irrespective of presentation:

1. **Declarative memory (explicit):**
    a) *lexical memory*: own stored vocabulary
    b) *episodic memory*: events
    c) *semantic memory*: facts
2. **Procedural memory (implicit):**
    a) motor skills
    b) perceptual skills
    c) intuitive cognitive skills
3. **Perceptual Representation System (PRS):**
    a) perceptual identification of objects and perceptual priming i.e. the enhancement of such identification through experience e.g. recognizing a style of painting

Retrieval

- recall appears to be organized according to applied strategies such as *semantic clustering*
- recognition alone indicates storage but incomplete retrieval i.e. *bypass retrieval*
- in learning word lists, mnemonic devices include forming new associations to words
- several associations to each word appear to enhance learning/ retrieval
- when a person's internal state can aid or impede retrieval, memory is called **state-dependent**
- when memory can be helped or hindered by similarities in environmental context, it is termed **context-dependent**

Major system	Other terms	Retrieval
1. Procedural	Non-declarative	Implicit
2. Perceptual representation	Quasi-memory	Implicit
3. Short term	Primary, working	Explicit
4. Semantic	Knowledge	Implicit
5. Episodic	Autobiographical	Explicit

Models of memory

Dual memory theory

- Atkinson and Shifferin (1971)
- information enters STM and is maintained by rehearsal, or lost by displacement
- information is transferred through the rehearsal buffer to LTM

Levels-of-Processing theory

- Craik and Lockhart (1972)
- an item entering memory system is analyzed in the three stages:
    1. perceptual level
    2. phonetic level
    3. semantic level
- each level of processing leaves a memory trace, and the deeper the level of processing the stronger the trace and the more durable the memory
- it can be aided by:
    - **Maintenance rehearsal** – simply repeating an item over and over
    - **Elaborative rehearsal** – involves thinking about how new material relates to information already stored in memory
- memory is enhanced more by elaborative rather than maintenance rehearsal

Transfer-Appropriate Processing

- suggests that the critical determinant of memory is how the encoding process matches up with what is ultimately retrieved

- e.g. students do better at MCQ exams if they studied for an MCQ exam

Parallel Distributed Processing

- suggests that new experiences change people's overall knowledge base, and every unit of knowledge is ultimately connected with every other unit
- the connections become stronger as they are experienced together more frequently

Information Processing

- suggested that in order for information to become firmly embedded in memory, it must pass through three stages of mental processing:
    1. sensory memory
    2. short-term memory
    3. long-term memory

Long-term potentiation (LTP)

- the long-lasting increase in the efficiency of a single set of synapses
- postulated that it could be the substrate for associative learning
- depends on the activation of NMDA receptors in the hippocampus

Constructive memory

- is often used for complex material
- memory is not a tape recorder - we actively process information to understand it
- inferences are drawn and added to the story
- social stereotypes are used
- we tend to fit information to our existing schemata
- information which does not fit is either discarded or distorted and constructed to fit

Forgetting

- rapid loss of most acquired material initially
- two hypotheses:

1. **interference theory:**
    - forgetting is determined by activity between learning and recall
    - forgetting is item dependent - a piece of information may actually displace other information, or a piece of information makes storing or recalling other information more difficult
    - new information learned in interim period impairs recall
    - in the case of short-term memory, rehearsal prevents displacement by continually re-entering the same information into short-term memory

- *retroactive interference:*
    - the learning of new material can interfere with the recall of older information

Group	**Time 1**	**Time 2**	**Time 3**
Experimental	Learn List A	Learn List B	Recall List B
Control		Learn List B	Recall List B

    - As a result of retroactive interference, the control group will be able to recall more material from list B

- *proactive interference:*
    - old learning likely to impair (rather than facilitate) subsequent learning

Group	**Time 1**	**Time 2**	**Time 3**
Experimental	Learn List A	Learn List B	Recall List A
Control	Learn List A		Recall List A

    - The control group will be able to recall more material from list A

- *primacy effect*: first words learned are retained better, as they have already entered LTM
- *latency effect:* last words learned are remembered better if tested immediately after presentation, since they are still retained in STM

2. **decay theory:**
    - forgetting is time dependent
    - BZDs taken after learning a word list improve its subsequent recall, perhaps by partly suppressing registration of new information
    - repression as motivated forgetting is intuitively plausible but difficult to demonstrate

The neurophysiology of memory

Short term memory

- depends on electrical activity of neurons and functional alteration in synapses
- *continuing activity* hypothesis
- *dynamic engram*: a closed network of neurons corresponding to a single memory trace

Long term memory

- *interneural hypothesis:*

    - results from structural changes of the neural circuit:
        - increased neuroglial cells
        - more branching of dendrites
        - changes in synapses
    - structural changes lead to formation of a *structural engram*
- *intraneural hypothesis*:
    - postulates that invidividual memories are embodied in individual coded macromolecules (peptides, RNA)

- **limbic system** is essential for LTM:
        - anterior cingulate gyrus
        - hippocampus
        - septal nuclei
        - hypothalamus
        - non-specific thalamic nuclei
        - anterior thalamic nucleus
        - amygdaloid nucleus
        - mammillary bodies
- **hippocampus:**
        - bilateral damage results in anterograde amnesia
        - damage to posterior hypothalamus, mammillary bodies and terminal portions of fornices give rise to Korsakoff type of memory deficit
- **neocortex:**
        - learning and memory functions are diffuse in many areas of cortex
        - memory impairment depends on amount of tissue destroyed rather than its site

Neurochemistry of memory

Cholinergic system

- medial septum and diagonal band of broca project to the hippocampus
- nucleus basalis of Meynert projects to the amygdala and widely to the neocortex
- basal forebrain lesion can cause amnesia; 3 clinical syndromes:
    1. Alzheimer's disease
    2. Korsakoff's disease
    3. amnesia with anterior communicating artery aneurysm
- the anticholinergic drug HYOSCINE causes amnesia
- cholinergic agonists such as ARECHOLINE, PYSOSTIGMINE, CHOLINE, and LECITHIN have been reported to improve memory

Adrenergic system

- decrease in MPHG in CSF of Korsakoff's syndrome (McEntee and Mair, 1978)
- neuronal loss in locus coeruleus in Alzheimer's disease
- enhancement of LTM when NA was applied to hippocampus

Serotinergic system

- ACh release is under inhibitory 5-HT tone
- 5-HT inhibition or destruction of 5-HT cells increases ACh release in cortex, hippocampus and striatum
- m-chlorophenylpiperazine (mCPP), a 5-HT_{1C} agonist impairs cognition
- ONDANSETRON, a selective 5-HT_3 receptor antagonist improves cognition in animals

Opioid peptides

- high concentration in the limbic system
- enkephalins and endorphins interfere with memory formation when the experience is associated with a painful stimulus - they decrease the emotional component of the painful experience associated with learning

Ribonucleic acid (RNA)

- implicated in memory transfer
- interference with RNA synthesis impedes learning; facilitation of synthesis enhances learning

Amnesic syndrome (anterograde amnesia)

- due to two possibilities:
    1. inability to transfer from STM to LTM; able to retrieve from LTM but no new memories; can show intact STM in digit span
    2. retrieval deficit rather than encoding problem

Reconstructive memory

- demonstration that eye-witness accounts distorted by biased questioning
- serial reproductions of narrative show shortening and more coherent with elision of detail
- episodic memory shows effort after meaning

Language

- codified system for communication, with capacity for generating and receiving infinite variety of messages
- psycholinguistic categories of:
    - *syntax* (grammar)
    - *semantics* (meaning)
    - *pragmatics* (social use of language)
    - *phonology*:
        - study of basic sounds, *phonemes* = smallest unit of sound that affects the meaning of speech; there are 40 in English
        - their combination into *morphemes* = smallest unit of language that has meaning; e.g. 'dog', 'un-', '-ed'
        - expression of morphemes in *rhythms* and *cadences* - *prosody*)

Language development

1. Pre-Linguistic 0-12 months

a)	crying	
b)	cooing	6 wks (vowel sounds)
c)	babbling	6 months (appearance of consonants) even in the deaf
d)	tuneful babble	8 months (intonations simulate conversational cadences)
e)	phonemic contraction	10 months (to range used in native tongue)
f)	repetitive phonemes	11 months

2. Single word stage 12-18 months

a) constant utterance to refer to a thing
b) parents often confuse with repetitive phonemes (ma-ma etc.)
c) holophrastic use - one word for complex meanings
d) by 18 months, about 18 words, mainly nouns and some action verbs

3. Two word stage 18-30 months

a) telegrammatic grammar in rather rigid word order
b) words often too numerous to count by 2 years
c) probable limit of non-human primate communication

4. Grammatical differentiation 30-48 months

a) increasing length of utterances
b) inclusion of function words such as prepositions and conjunctions
c) increasing development of syntactical rules (e.g. adding 's' to pluralize everything)

5. From 5 years

a) use of passives, subjunctives, etc.
b) learning of more advanced conversational rules e.g. not interrupting
c) gradual internalization of speech into verbal thought

Clinical relevance

- semantic-pragmatic disorder

- disorders of interpersonal functioning also show disordered language development e.g. Autism, Asperger's syndrome
- delayed speech may have a social causation and has behavioural consequences e.g. tantrums
- speech as an aspect of social functioning may be inhibited e.g. elective mutism
- difficulties separating speech and thought e.g. in schizophrenia

Cerebral considerations

- 99% of right handed people have a dominant left hemisphere
- 60% of left-handed people have a dominant left hemisphere

Pathways involved

1. Hearing:
   a) speech → auditory cortex → auditory association cortex → Wernicke's area → comprehension
2. Reading:
   a) written word → visual cortex → visual association cortex → angular gyrus → Wernicke's area → comprehension
3. Speaking:
   a) thought → Wernicke's area → Broca's area → motor speech areas → speech
4. Writing:
   a) thought → Wernicke's area → angular gyrus → motor areas → writing

Causes of slower speech development

- being male
- being a twin
- prolonged second-stage labour
- larger family size

Thought

- thinking is the manipulation of mental representations

Information-Processing Speed – Reaction time

- depends on:
    - the *complexity* of the decision
    - *stimulus-response compatibility*
        - if the spatial relationship between a set of stimuli and possible responses is a natural or compatible one, reaction time will be fast
    - *expectancy*
        - expected stimuli are perceived more quickly and with greater accuracy than those that are surprising
- in any reaction-time task, there is a *speed-accuracy trade-off*
    - if you try to respond more quickly, errors increase

Evoked brain potentials

- the evoked brain potential is a small, temporary change in voltage on an EEG that occurs in response to specific events
- there is a negative peak (N100) followed by a large positive peak (P300)
- the exact timing of P300 is sensitive to factors that alter the speed of perceptual processes

Mental representations

Cognitive maps

- a *cognitive map* is a mental representation of a familiar part of your world e.g. your home
- include *systematic distortions*, e.g. *rectangular bias*, a tendency to impose a rectangular north-south-east-west grid on the environment

Images

- are mental representations of visual information
- manipulations performed on images of objects are similar to those that would be performed on that object in the real world
- when objects are of a similar size, we must summon an image of each, then carefully compare them - the greater detail of the comparison or the more similar the objects, the longer the response time

Concept schemas and event scripts

- **concepts** are categories of objects, events, or ideas with common properties
    - they may be concrete and visual e.g. ‘round’ or ‘red’
    - or abstract, such as ‘truth’ or ‘justice’

- *artificial concepts* (e.g. ‘square’) can be clearly defined by a set of rules or properties such that each member of the concept has all of the defining properties and no nonmember does
- *natural concepts* (e.g. ‘home’ or ‘game’) have no fixed set of defining features, but instead share a set of characteristic features
- it is usually a combination of properties that define a concept
- most of the concepts that people use are natural
- a member of a natural concept that possesses all or most of its characteristic features is called a **prototype**
    - the closer the object to the prototype, the faster the speed that we can decide if it is a member of the concept
- concepts can be mentally represented as **schemas**, generalizations we develop about categories of objects, events, and people
- schemas about familiar sequences of events or activities (e.g. entering a restaurant) are called **scripts**
    - scripts are involved in the top-down processing that enables people to recognize and react to expected events than unexpected events

Propositions

- a *proposition* is the smallest unit of knowledge that can stand as a separate assertion
- e.g. ‘dogs chase cats’, ‘birds have wings’

Thinking strategies

- *reasoning* is the process through which people generate and evaluate arguments, and reach conclusions about them

Formal reasoning

- *formal,* or *logical reasoning* seeks valid conclusions through the application of rigorous procedures
- includes **algorithms** - systematic methods that always reach a correct result
- **logic** - a set of mental procedures that provide a more general algorithm, or formula, for drawing valid conclusions about the world
- logical arguments containing two or more premises and a conclusion are known as **syllogisms**
    - the conclusion is an *inference,* based on the premises and the rules of logic
    - a premise can be false yet the logic can still be correct
    - e.g. All doctors are brilliant
I am a doctor
Therefore, I am brilliant
    - the logic is correct, but the first premise is incorrect

Problems with logical reasoning

1. *Bias about conclusions* - people may agree with a conclusion not because they have examined the premises, but because they hold a prior belief about the conclusion
2. *The conversion effect* - people assume that because A implies B, then B implies A

3. *Limits on working memory* - arises if elements in a syllogism involves negatives, e.g. “No dogs are nonanimals”

Informal reasoning

- people use *informal reasoning* to assess the credibility of a conclusion based on the evidence for it
    - e.g. how many swans do you have to observe before you conclude that all swans are white?
    - formal reasoning = all of them
    - informal reasoning = a mental rule of thumb enables you to gauge what the correct answer will be
- **heuristics** are these ‘mental shortcuts’, or rules of thumb
- there are three important heuristics:

1. *The anchoring heuristic* - estimating the probability of an event by adjusting a starting value
    - e.g. if you thought the probability of being mugged in New York is 90 %, and then found out it was closer to 1 %, you might reduce your estimate only to 80 %
    - presents a challenge to defence attorneys, because the prosecution’s evidence is presented first and it may be hard to alter the juror’s belief of guilt
2. *The representatives heuristic* - people base conclusions about whether an example belongs in a certain class on how similar it is to other items in that class
    - e.g. if a patient has symptoms that are similar to a common disease but are even more representative of a rarer one, physicians are more likely to diagnose the rarer condition
3. *The availability heuristic* - involves judging the probability that an event may occur or that a hypothesis may be true by how easily the hypothesis or examples of the event can be brought to mind
    - means that TV news reports showing airline crashes may make those rare events so memorable that people refuse to fly because they overestimate the probability of a crash

Problem solving

Strategies for problem solving

1. *decomposition* - dividing the problem into smaller, more manageable subproblems
2. *working backward*
3. finding *analogies* - recognizing the similarities between the current problem and previous problems
4. *incubation* - laying it aside for a while, so that (probably) incorrect ideas that were previously blocking the path to a correct solution are forgotten

Obstacles to problem solving

1. *multiple hypotheses* - the particular hypothesis that comes to mind may be the one that easily comes to mind, not the one most likely to be correct

2. *mental sets* - a mental set consists of a tendency to stick with a strategy or solution that worked in the past
    - experience may produce *functional fixed-ness*, the tendency to use familiar objects in familiar rather than creative ways
    - an incubation strategy often helps to break mental sets
3. *the confirmation bias* - humans have a strong bias to confirm rather than refute the hypothesis they have chosen, even in the face of strong evidence against the hypothesis
4. *ignoring negative evidence* - compared with symptoms or events that are present, events that do not occur are less likely to be noticed and observed

Personality

- the unique pattern of enduring psychological and behavioural characteristics by which each person can be compared and contrasted with other people

Freud

The topographical model

1. unconscious
2. preconscious
3. conscious

The structural model

1. id
2. ego
3. superego

- also includes *eros* and *thanatos*
- based on biological instincts

Variations on Freud's Personality Theory

Adler's Individual Psychology (Alfred Adler 1927)

- emphasized the role of social rather than sexual urges
- wrote about sibling position
- believed that it is not the id but rather an innate desire to overcome infantile feelings of helplessness that provides the impetus for the development of personality - he called this process *striving for superiority*
- the ways in which each person tries to reach fulfillment constitute personality
- personality is directed not just by the unconsciousness but also by what he called *guiding fictions*: conscious ideas, goals, and beliefs that arise primarily from experiences within the family

Jung's Analytic Psychology (Carl Jung 1916)

- argued that libido was not just a sexual instinct but a more general life force that includes an innate drive for creativity, for growth-oriented resolution of conflicts, and for the productive blending of basic impulses with real-world demands
- suggested that people develop, over time, differing degrees of *introversion* or *extraversion*

Other Neo-Freudian theorists

- **Karen Horney** (1937) challenged the view that women's lack of a penis caused them to feel inferior to men
- she argued that it is men who envy women since they cannot bear children - she called this 'womb envy'

- **Erich Fromm**
- **Henry Stack Sullivan**
- **Erik Erikson**

The Trait Approach

- *traits* are the inclinations or tendencies that help to direct how a person usually thinks and behaves
- a *type* is a discrete category
- type theories include:
    - Hippocrates (sanguine, phlegmatic, melancholic, choleric)
    - William Sheldon - *physiognomy*
    - Myers-Briggs personality test
        - based on Jung's 16 personality types
        - validity is questionable
- the trait theories make 3 basic assumptions:
    1. personality traits are relatively stable and therefore predictable over time
    2. personality traits are relatively stable across diverse situations, and they can explain why people act in predictable ways in many different settings
    3. people differ with regard to how much of a particular trait they possess - the result is an endless variety of unique personalities
- trait psychologists use a **nomothetic** approach, assuming that there are a number of traits that are common to all people

Prominent Trait Theories

Allport's trait theory (Gordon Allport 1961)

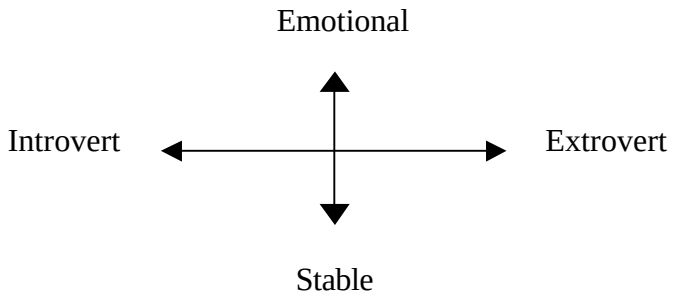
- believed that people possess *central traits* which are usually apparent to others and comprise characteristics that organize and control behaviour in many different situations (e.g. 'reliable', 'distractible')
- also thought that people possess *secondary traits* which are specific to certain situations and control far less behaviour (e.g. 'dislikes crowds')
- his focus on the uniqueness of each individual personality made it difficult to draw conclusions

Cattell's Factor-Analytic Approach (Raymond Cattell 1965)

- asked people to rate themselves on many of the trait-descriptive terms identified by Allport, and used *Factor Analysis* to calculate the degree to which various personality traits correlated with each other
- he identified sixteen dimensions, or factors, including shy vs. bold, trusting vs. suspicious, and relaxed vs. tense
- he believed these *common traits* are found in everyone, and measured their strength through the *Sixteen Personality Factor Questionnaire,* or 16PF

Eysenck's Biological Trait Theory (Hans Eysenck 1990)

- uses a **dimensional** approach to personality
- concluded that personality can be described in terms of three basic factors or dimensions (P, E, and N):
    1. **Psychoticism** - people scoring highly show such attributes as cruelty, hostility, coldness, oddness, and rejection of social customs
    2. **Introversion-Extraversion** (the most reliable of the dimensions)
    3. **Emotionality-Stability (a.k.a. Neuroticism)** - high scorers exhibit characteristics such as moodiness, restlessness, worry, anxiety
- the *Eysenck Personality Inventory* can predict people's key characteristics:



    - criminals are likely to be in the 'choleric' quadrant (emotional and extraverted)
    - people with anxiety disorders tend to be in the 'melancholic' quadrant (emotional and introverted)
- predicts that people with sensitive, 'overaroused' nervous systems are likely to be strongly affected by rewards and punishments, to readily develop conditioned responses such as fears and oversensitivities, and to be introverted
- of these dimensions, **E** has been most strongly supported by research
- Eysenck postulated that the biological bases of neuroticism are variations in the reactivity of the autonomic nervous system
- the bases of **E** are differences in the reticular activating system
- the introvert is said to condition more readily, and to develop responses which are stronger and more resistant to extinction
- people high on the **N** dimension are said to be more likely to develop neurotic symptoms under stress
- people low on **E** but high on **N** develop disorders characterized by excessive conditional anxiety (phobias, generalised anxiety, obsessional states)
- those high on **E** and **N** tend to develop disorders characterized by absence of control (hysterical and psychopathic conditions)

The "Big-Five" model (Paul Costa & Robert McCrae 1992)

Dimension	Defining descriptors
Openness to experience	artistic, curious, imaginative, insightful, original, wide interests, unusual thought processes, intellectual interests
Conscientiousness	efficient, organized, planful, reliable, thorough, dependable, ethical, productive
Extraversion	active, assertive, energetic, outgoing, talkative, gregarious
Agreeableness	appreciative, forgiving, generous, kind, trusting, non-critical, warm, compassionate, considerate
Neuroticism	anxious, self-pitying, tense, emotionally unstable, impulsive, vulnerable, worrying

- different investigators find these factors when they factor-analyze data from numerous sources
- valid in many different countries including Canada, Germany, Finland, India, the Philippines, Poland, China, and Japan

Genetic basis of personality traits

- identical twins tend to be more alike in personality than non-identical twins, regardless of whether they are raised together or apart
- behavioural geneticists have concluded that at least 30 % and perhaps as much as 60 % of the variability in adult personality traits is due to genetic factors

The Cognitive-Behavioural approach

- view personality as the array of behaviours that people acquire through learning and display in particular situations
- often called the *social learning* approach - it views personality as the sum total of the behaviours and cognitive habits that develop as people learn through experience in the social world
- John B. Watson used research on classical conditioning to support his claim that all human behaviour is determined by learning
- B. F. Skinner emphasized the importance of operant conditioning - through *functional analysis* he sought to understand behaviour in terms of its function in obtaining rewards or avoiding punishment

Rotter's Expectancy theory (Julian Rotter 1982)

- argued that learning creates cognitive expectancies that guide behaviour
- suggested that a person's decision to engage in a behaviour is determined by:
    1. what the person expects to happen following the behaviour
    2. the value the person places on the outcome

- behaviour is therefore influenced by a cognitive *expectation* that they will obtain a particular reward
- some people (*internals*) are likely to expect events to be controlled by their own efforts
- others (*externals*) tend to expect events to be determined by external forces over which they have no control. When externals succeed, they are likely to believe that it was due to chance or luck
- internals:
    - tend to get better grades and to score higher on standardized academic tests
    - less likely to smoke
    - work harder at staying healthy
    - more likely to exercise
    - more likely to wear seat belts
    - if they are hospitalized, internals are more cooperative patients, and are released sooner

Reciprocal Determinism (Albert Bandura 1986)

- personality is shaped by *reciprocal determinism* - behaviour tends to affect their environment, which in turn affects cognitions, which may affect behaviour, and so on
- **self-efficacy** is the learned expectation of success, the belief that you can successfully perform a behaviour regardless of past failures or current obstacles
- self-efficacy interacts with expectancies about the outcome of behaviour in general, and the result of this interplay helps to shape a person's psychological well-being:

		Outcome Expectation	
		-	+
Self-efficacy judgement	+	social activism protest grievance milieu change	assured opportune action
	-	resignation apathy	self-devaluation despondency

Mischel's Person-Situation Theory (Walter Mischel 1993)

- learned beliefs or expectancies characterize each individual and make that individual different from other people - these cognitive characteristics are called *person variables*
- the most important person variables are:
    1. **competencies** (the thoughts and actions the person can perform)
    2. **perceptions** (how the person perceives the environment)
    3. **expectations** (what the person expects to follow from various behaviours)

4. **subjective values** (the person's ideals and goals)
5. **self-regulation and plans** (the person's standards for self-reward and plans for reaching goals)

- certain conclusions have resulted from the debate over personality traits vs. situational factors:

1. traits influence behaviour only in relevant situations (e.g. anxiety is only felt in situations where the person is threatened)
2. traits can lead to behaviours that alter situations that, in turn, promote other behaviours
3. people choose to be in situations that are in accord with their traits (e.g. introverts are more likely to choose quiet environments)
4. traits are more influential in some situations than in others - in ambiguous or unconstrained situations, people's behaviour may be predicted from their personality traits

The Phenomenological Approach

- maintains that the way people perceive and interpret the world forms their personality and guides their behaviour
- focuses on mental qualities that set humans apart: self awareness, creativity, planning, decision making, and responsibility
- also called the *humanistic* view of personality
- the primary human motivator is an innate drive towards growth that prompts people to fulfill their unique and natural potential

Rogers' Self Theory (Carl Rogers 1942-1980)

- assumes that each person responds as an organized whole to reality as he or she perceives it
- emphasized **self-actualization** - an innate tendency towards growth that motivates all human behaviour
- personality is the expression of each individual's self-actualizing tendency as it unfolds in that individual's uniquely perceived reality
- early in life, children learn to need other people's approval, or *positive regard*
- when evaluations by others are *congruent* with self-experience, the result is a clearly identified and positively evaluated experience of the self, which becomes part of the **self-concept**
- Rogers argued that psychological discomfort, anxiety, or mental disorder can result when the feelings people experience or express are *incongruent* with their true feelings
- **conditions of worth** (when a child believes that his or her worth as a person depends on displaying the 'right' attitudes, behaviours, and values) are created whenever people are evaluated instead of their behaviour - they are first set up by external pressure but eventually become part of the person's belief system

Maslow's Humanistic Psychology (Abraham Maslow 1954-1971)

- believed that self-actualization is not just a human capacity but a human need
- he saw most people as controlled by **deficiency orientation**, a preoccupation with perceived needs for material things
- people with a **growth orientation** do not focus on what is missing but draw satisfaction from what they have, what they are, and what they can do
- this opens the door to what Maslow called *peak experiences*, in which people feel joy in the mere fact of being alive, and knowing that they are utilizing their full potential

Motivation

- the factors that influence the initiation, direction, intensity, and persistence of behaviour

Instinct theory

- proposes that some aspects of human behaviour are innate - *fixed-action patterns* - unlearned, genetically coded responses to specific 'releaser' stimuli

Intrinsic theories

- the activity engaged in has its own intrinsic reward:
  1. optimal arousal
  2. cognitive dissonance
  3. attitude-discrepant behaviour
  4. need for Achievement (nAch)

External theories

1. drive reduction theory

Drive reduction theory (Mowrer)

- based on the principle of **homeostasis** - the tendency for organisms to keep physiological systems at a steady level
- according to drive reduction theory, an imbalance in homeostasis creates a **need** - a biological requirement for well-being
- the brain responds by creating a psychological state called **drive** - a feeling of arousal that stimulates an organism to restore the balance
- **primary drives** stem from biological needs, such as food or water, which are *primary reinforcers*
- we learn other drives, called **secondary drives** which, once learned, motivate us to act as if we have an unmet basic need – for example, anxiety can be learnt by generalization and conditioning

Arousal theory

- proposes that motivation is tied to the regulation of **arousal** - a general level of activation reflected in the state of several physiological systems
- normally arousal is lowest during deep sleep, and highest during panic or great excitement
- people perform best when arousal is moderate (**Yerkes-Dodson theory**)
- if arousal is high there is:
  - improved performance on familiar tasks
  - reduced performance on complex or new tasks, and inhibition of acquisition of new learning
- people are motivated to behave in ways that keep them at their own *optimal level* of arousal - it is higher for some people than others

- generally, people try to increase arousal when it is low, and vice versa

Incentive theory

- behaviour is guided by the lure of rewards (*positive incentives*) and the threat of punishment (*negative incentives*)
- cognitive factors influence expectations of the value of various rewards and the likelihood of attaining them

The need for achievement (Murray, 1938; McLelland, 1958)

- the motive to succeed is called **need achievement**

1. individuals with high achievement motivation strive for excellence, persist despite failures, and set challenging but realistic goals
2. parents with children who scored high on tests of achievement motivation tend to:
    a) encourage the child to try difficult tasks, especially new ones
    b) give praise and other rewards for success
    c) encourage the child to find ways to succeed rather than merely complaining about failure
    d) prompt the child to go on to the next, more difficult challenge
3. **gender differences**
    a) often appear at a young age, apparently due to early learning experience
    b) females are more likely than males to attribute failure on school-related tasks to lack of ability, and they tend to begin doing so at an early age
    c) boys learn to see failure as due to lack of effort or some other situational factor
    d) gender role stereotypes discourage achievement motivation in women
        i) as a result, some women hide successes or act in ways that undermine their chance of success - a pattern called *fear of success*
4. workers are most satisfied and productive when they are:
    a) encouraged to participate in decisions about how work should be done
    b) given problems to solve, without being told how to solve them
    c) taught more than one skill
    d) given individual responsibility
    e) given public recognition, not just money, for good performance
5. the most motivating jobs are those that offer:
    a) clear and specific goals
    b) a variety of tasks
    c) individual responsibility
    d) other intrinsic rewards

Maslow's hierarchy of needs

- Abraham Maslow (1970) suggested that human behaviour is influenced by a hierarchy of five classes of needs, or motives
- needs at the lowest level of the hierarchy must be at least partially satisfied before people can be motivated by higher-level goals

1. **Biological**
   a) food
   b) water
   c) oxygen
   d) activity
   e) sleep
2. **Safety**
   a) being cared for as a child
   b) secure income as an adult
3. **Belongingness and love**
   a) being part of various social groups
   b) participating in affectionate sexual and non-sexual relationships
4. **Esteem**
   a) being respected as a useful, honourable individual
5. **Self-actualization**
   a) exploring and enhancing relationships with others
   b) following interests for intrinsic pleasures
   c) concern with issues affecting all people, not just themselves

Central control of appetite

- three areas of the hypothalamus play primary roles in detecting and reacting to the blood's signals about the need to eat
- activity in fibres passing through the **ventromedial nucleus** appear to tell an animal there is no need to eat
    - if this region is stimulated, the animal stops eating
    - however, if it is destroyed, the animal will eat ravenously
    - the ventromedial nucleus seems to act as a 'stop-eating' centre
- the **lateral hypothalamus** appears to act as a 'start-eating' centre
    - stimulation causes rats to eat in vast quantities, even if they have just eaten
    - destruction causes them to stop eating almost entirely
- destruction of the lateral or ventromedial hypothalamus seems to alter the *set point* of body weight
- **paraventricular nucleus (PVN):**
    - hungers for different types of food seem to be related to the action of different neurotransmitters on PVN neurons
    - *neuropeptide Y* stimulates carbohydrate eating
    - *serotonin* reduces carbohydrate consumption
    - *galanin* motivates eating of high fat food
    - *enterostatin* reduces fat consumption

Emotion

- the subjective experience of emotion has several characteristics:
    - emotion is *transitory*; it tends to have a clear beginning and end, and a relatively short duration. Moods, by contrast, tend to last longer
    - emotional experience has *valence*, which means it is either positive or negative
    - emotional experience is elicited partly by a *cognitive appraisal* of how a situation relates to your goals
    - emotional experience *alters thought processes*, often by directing attention toward some things and away from others
    - emotional experience *elicits an action tendency*, a motivation to behave in certain ways
    - emotional experiences are *passions* that happen to you, usually without willful intent

The biology of emotion

- activity in the *limbic system*, especially the *amygdala*, is central to various aspects of emotion
    - victims of a disease that destroys only the amygdala are unable to judge other people's emotional state by looking at their facial expressions
- facial movements associated with emotions are governed by the *extrapyramidal motor system*, which depends on subcortical areas
    - people with damage to the pyramidal system show normal facial expressions during genuine emotion, but cannot fake a smile
    - people with damage to the extrapyramidal system can pose facial expressions at will, but remain straight-faced even when feeling joy or sadness
- the right hemisphere is activated during many displays of emotion - the *experiencing* of negative emotion, the *perception* of any emotion, and the facial expression of any emotion depend on the right hemisphere more than the left
- the *experiencing* of positive emotion may depend on the *left frontal cortex*
    - depressed people display greater electrical activity in the right frontal cortex and perform more poorly on tasks that depend on the right hemisphere
    - after suffering damage to the right, but not the left, hemisphere, people no longer laugh at jokes, even though they can understand the words, the logic, and the punch lines
    - when people are asked to name the emotions shown in slides of facial expressions, blood flow increases in the right hemisphere more that the left

Primary emotions (Plutchik)

1. disgust
2. anger
3. anticipation
4. joy
5. acceptance

6. fear
7. surprise
8. sadness

Secondary emotions

- a combination of primary emotions:
  1. love = joy + acceptance
  2. submission = acceptance + fear

The James-Lange theory of emotion

- William James, 1890
- Carle Lange
- he reasoned that emotion is simply the result of experiencing a particular set of physiological responses
- holds that reflexive peripheral responses precede the subjective experience of emotion, and that each particular emotion is created by a particular pattern of physiological responses

Components of emotional experience

1. Sensation/ perception
   a) "it's a bear"
2. Cognitive interpretation
   a) "that bear can kill me"
3. Activation of CNS and peripheral nervous system
4. Peripheral responses
   a) increase in heart rate, change in facial expression
5. Perception of peripheral responses
6. Cognitive interpretation of peripheral responses

Evaluating the James-Lange theory

- research shows that certain emotional states are indeed associated with different patterns of autonomic changes
- different patterns of autonomic activity are closely tied to specific emotional facial expressions, and vice versa - subjects who create the facial expression associated with a particular emotion experience that emotion
- James' theory implies that the experience of emotion would be blocked if a person were unable to detect physiological changes occurring in the body's periphery
  - spinal injury patients are able to experience the full range of emotion
- the *facial feedback hypothesis* maintains that involuntary facial movements provide sufficient peripheral information to drive emotional experience

Schachter-Singer theory of emotion

- suggests that physiological responses are primary sources of emotion, but that cognitive interpretations of the eliciting situation are required to *label* the emotion, a process that depends on *attribution*
- attributing arousal from one situation to stimuli in another situation can produce *transferred excitation*, intensifying the emotion experienced in the second situation
    - this transfer is most likely to occur when the overt signs of physiological arousal have subsided but the sympathetic nervous system is still active

Evaluating Schachter's theory

- the theory predicts that emotional experience will be less intense if arousal is attributed to a nonemotional cause
- it also predicts that if arousal is artificially induced, emotion will be created if there is a situation to which the drug-induced arousal can reasonably be attributed

Cannon-Bard theory of emotion

- sensory information about emotional situations first reaches the thalamus, which sends signals simultaneously to the autonomic nervous system and to the cerebral cortex, where the emotion becomes conscious
- the brain directly creates the experience (of fear for example) while at the same time sending messages to the heart, lungs, and legs

Updating Cannon's theory

- the thalamus is not the 'seat' of emotion, although it does participate in some aspects of emotional processing
- an updated version of the theory suggests that specific brain areas produce the feelings of pleasure or pain associated with emotion
- some pathways in the brain, such as that from the thalamus to the amygdala, allow strong emotions to occur before conscious thought can take place

Emotional expression

- as children grow, they learn an *emotional culture* - rules that govern what emotions are appropriate in what circumstances and what emotional expressions are allowed
- the same emotion may be communicated by different facial expressions in different cultures

Social referencing

- the process of letting another person's emotional state guide our own behaviour is called *social referencing*
- this occurs especially in ambiguous situations

Stress

- stress is the negative emotional and physiological process that occurs as individuals try to adjust to or deal with environmental circumstances that disrupt, or threaten to disrupt, their daily functioning
- the environmental variables are called *stressors*
- some people are more strongly affected by stressors than others - due to *mediating factors*

stressors ¬ ----------® stress mediators ¬ ----------® stress reactions

• life changes and strains • catastrophic events • daily hassles • chronic stressors	cognitive appraisal predictability control coping resources and methods	physical psychological -emotional -cognitive behavioural

The Diathesis-Stress Model

1. individual response stereotype – predisposition to respond physiologically to various situations
2. inadequate homeostatic restraints caused by stress-induced breakdown, genetic predisposition

- Important factors:
  - situation
  - perception of situation
- Less important:
  - coping style
  - values and attitudes
  - learned responses

Stress responses

Physical Stress responses: The GAS

- suggested by Hans Selye (1956,1976)
- the sequence of physical responses to stress occurs in a consistent pattern and is triggered by the effort to adapt to any stressor
- he called this the **general adaptation syndrome** and it has three stages:

1. *alarm reaction*
   a) controlled by sympathetic branch of the autonomic nervous system
      i) secretion of catecholamines >
      ii) increased blood pressure

iii) enhanced muscle tension
iv) raised blood sugar

2. *resistance*
   a) involves the hypothalamic-pituitary-adrenocortical (HPA) system
      i) β endorphin - relieves pain
      ii) ACTH - results in release of cortisol to release energy stores and fight inflammation
3. *exhaustion*
   a) brings about signs of physical wear and tear
      i) immunosuppression
      ii) impaired cardiac function
   b) Selye referred to illnesses that are caused or worsened by stressors as **diseases of adaptation**

Physiological Stress Responses

- increased titres to latent viruses (e.g. herpes)
- reduced activity of natural killer cells
- reduced lymphocyte toxicity
- reduced response of T-lymphocytes to mutagens

Emotional Stress Responses

- people are more likely to report the emotional effects of a stressor than the physical effects
- in most cases, emotional stress reactions subside soon after the stressors are gone

Cognitive Stress Responses

- e.g. reductions in concentration, ability to think clearly, or to remember accurately are common
- *ruminative thinking* - the recurring intrusion of thoughts about stressful events
- *catastrophizing* - dwelling on and overemphasizing the potential consequences of negative acts
- people under stress are more likely to cling to *mental sets*
- stress can also intensify *functional fixedness*, the tendency to use objects for only one purpose e.g. not using a telephone to break a window in a hotel fire

Behavioural Stress Responses

- strained facial expressions
- shaky voice
- tremors or spasms
- jumpiness
- changes in posture
- increase in the number of domestic violence reports in the months after Hurricane Andrew hit south Florida in 1992

Stress mediators

Predictability and Control

- knowing that a particular stressor *might* occur but being uncertain whether it will tends to increase the stressor's impact (e.g. wives of MIAs in Vietnam had higher stress than wives of KIAs)
- predictable stressors tend to have less impact than those which are unpredictable
- if people believe that they can exert some control over stressors, they usually have less impact - simply believing a stressor is controllable, even if it isn't, can reduce its impact
- people who feel they have no control over negative events appear prone to physical and psychological problems:
    - increased cortisol
    - increased catecholamines
- breast cancer patients who harbour a sense of helplessness have a lower survival rate than those with a greater sense of control

Coping Resources and Coping Methods

- John Mason, Marianne Frankenheimer – psychological appraisal of a stressful situation followed by coping, and/ or reappraisal
- *coping resources* include, for example, the money and time to deal with stressful events
- *coping skills*:
    - **Problem-focused coping**
        - *confronting* - "I stood my ground and fought for what I wanted"
        - *seeking social support* - "I talked to someone to find out more about the situation"
        - *planful problem solving* - "I made a plan of action and I followed it"
    - **Emotion-focused coping**
        - *self-controlling* - "I tried to keep my problems to myself"
        - *distancing* - "I tried not to think about it too much"
        - *positive reappraisal* - "I changed my mind about myself"
        - *accepting responsibility* - "I realized that I had brought the problem on myself"
        - *escape/ avoidance (wishful thinking)* - "I wished the situation would just go away, or be over with"

Social Support

- the friends and social contacts on whom you can depend on for support constitute your **social support network**
- the stress reducing effects of social support have been documented for:
    - cancer
    - crowding
    - military combat
    - natural disasters
    - AIDS

- some researchers have concluded that having inadequate social support nearly doubles a person's risk of dying from disease, suicide, or other causes
- disclosing, even anonymously, the stresses and traumas that one has experienced is associated with enhance immune functioning and decreased use of health services among students

Stress and Personality

- stress-related health problems are more common among people who:
    - persist at mentally evading stressors
    - perceive them as long-term, catastrophic threats they brought on themselves
    - are pessimistic about their ability to overcome negative situations
- one component of the disease-resistant personality is *dispositional optimism* - the belief or expectation that things will work out positively

The Type A personality

- associated with Richard Rosenman and Milton Friedman
- can be detected as early as 9 years old

Features

- **cynical hostility**, characterized by:
    - suspiciousness
    - resentment
    - frequent anger
    - antagonism
    - distrust of others
- competitiveness
- striving for achievement
- time urgency
- difficulty relaxing
- impatience
- anger

Complications

- Type A is associated with:
    - increased systolic BP
    - increased heart rate
    - increased plasma norepinephrine and epinephrine
    - increased plasma cortisol
    - reduced occipital alpha activity on EEG
- cynical hostility is a risk factor for coronary heart disease, and MI
- post-MI, Type B personality is more likely to suffer a subsequent event (mechanism unclear)

Management

- behaviours can be changed by:
    1. changing environmental demands

2. changing patients responses (cognitive and behavioural) by:
    - learning new behaviours
    - changing coping styles
    - relaxation
    - biofeedback
3. changing physiological concomitants

Coping with stress

Stages in coping with stress

1. *Assessment*
    - identify the sources and effects of stress
2. *Goal Setting*
    - list the stressors and stress responses to be addressed
    - designate which stressors are and are not changeable
3. *Planning*
    - list the specific steps to be taken to cope with stress
4. *Action*
    - implement coping plans
5. *Evaluation*
    - determine the changes in stressors and stress responses that have occurred as a result of coping methods
6. *Adjustment*
    - alter coping methods to improve results, if necessary

Developing coping strategies

1. *Cognitive coping strategies*
    - cognitive coping strategies can replace catastrophic thinking with thoughts in which the stressors are seen as challenges rather than threats - this process is called **cognitive restructuring**
2. *Emotional coping strategies*
    - seeking and obtaining social support
    - getting advice and feedback
3. *Behavioural strategies*
    - implementing a time-management plan
    - making life changes to eliminate stressors
4. *Physical strategies*
    - progressive relaxation training
    - exercise
    - biofeedback
    - meditation

Coping mechanisms

1. concentration only on the current task (denial)
2. empathy (projection)
3. logical analysis (rationalization)
4. objectivity (isolation)
5. playfulness (aggression)
6. substitution of other thoughts (reaction formation)
7. suppression of other feelings (repression)

Behaviour therapies

Behavioural (functional) analysis

- uses a subjective account by the patient of antecedents of the problem, the behaviours exhibited, and the consequences (the ABC)
- uses the assumption that immediate consequences are the key determinant of behaviour
- aims to define the problem and identify key variables
- analysis of phobias includes:
  - incubation
  - stimulus generalization
- analysis of an agoraphobic patient includes:
  - fear of closed spaces
  - fear of crowds
  - does not focus on recent life events or family history

Systematic Desensitization (Joseph Wolpe, 1958)

- based on social learning principles
- involves 3 stages:
  1. teaching the patient to relax (*progressive relaxation training)*
  2. a hierarchy of anxiety-arousing situations (*desensitization hierarchy)*
  3. presenting phobic items for the hierarchy in a graded way, while the patient inhibits the anxiety by relaxation
- occurs through *classical conditioning* of a new calmer response to the fear-provoking stimulus – behaviour is inhibited by relaxation
- *reciprocal inhibition* – the pairing of an anxiety provoking stimulus with a relaxing one

Flooding

- involves exposing patients to a phobic object in a non-graded manner with no attempt to reduce anxiety beforehand
- can be done in vivo or in imagination (when it is called *implosive therapy*)
- studies have shown that there is little difference between flooding and systematic desensitisation in the treatment of phobias

Contact desensitization

- combines *modelling* and guided participation
- the 'teacher' models desired behaviour and guides patient through steps in a hierarchy
- does not involve relaxation (c.f. systematic desensitization)
- based on *extinction* rather than relaxation to inhibit the anxiety
- used in the treatment of phobias

Modelling

- the combination of live modelling with gradual practice is called *participant modelling*
- modelling is involved in assertiveness and social skills training

Positive Reinforcement

- involves specifying the behaviours to be strengthened through reinforcement
- e.g. *token economy*

Extinction

- the process of removing the reinforcers that normally follow a particular response
- extinction changes behaviours slowly
- e.g. *flooding/ exposure techniques*

Aversive Conditioning

- uses classical conditioning
- associates physical or psychological discomfort with behaviours that the client wishes to stop
- e.g. ANTABUSE
- *covert sensitization* - the client first thinks of the inappropriately attractive stimulus (e.g. obscene phone call) and is then exposed to tape-recorded depictions of frightening or disgusting stimuli (e.g. worst fears/ mother finding out)

Biofeedback

- learning to control autonomic responses by visual/ auditory feedback from one's functions
- affected by:
  - motivation
  - feelings
  - attitudes
  - interpersonal relations

Contingency Management

- controls the contingency between reinforcement and behaviour
- controls the consequences of behaviour with appropriate reinforcement
  - e.g. token economy
  - improving socially adaptive behaviours, responsibility, and self-reliance

Cognitive restructuring

- based on the work of Albert Ellis
- changes faulty patterns of thinking
- attitudes affect behaviour, and changing behaviour can affect attitudes
- can be used to treat anxiety, and multiple fears in interpersonal situations

Token economies

- utilize *Premack's principle* – behaviours of high frequency may be used as reinforcers for those of low frequency
- can make psychotic symptoms worse initially, but they later return to their previous level
- behaviours do not generalize

Negative Practice

- Dunlap (1932)
- used for tics, stammering, thumb-sucking, nail-biting
- relies on the patient deliberately repeating the behaviour – inhibition accumulates during massed practice
- short-term benefit, but no sustained improvement

Cognitive therapy

- emphasis on information processing

Cognitive Distortions

- *arbitrary inference* = conclusions in absence of evidence
- *overgeneralisation* = conclusion formed on basis of one incident
- *selective abstraction* = person abstracts from whole situation and focuses on a single incident
- *personalisation* = relating external events to oneself
- *magnification*/ *minimization* = errors in evaluation
- *dichotomous reasoning* = 'all-or-nothing' thinking

- reasons for abnormal cognitions:
  - attend selectively
  - errors in logic
  - safety behaviours

General Principles

- time limited
- problem oriented
- a-historical
- homework
- openness
- Socratic questioning

Cognitive Formulation

1. Definition of the problem
2. Objective factors – current stresses, past traumatic events, current living situation
3. Internal vulnerability factors – main attitudes and beliefs which the patient holds
4. Mediational cognitive factors – typical automatic thoughts used
5. Current themes – e.g. loss of control, failure, low self-image
6. Coping skills
7. Emotions

Specific techniques

- monitor automatic thoughts
- to recognise connections between cognitions, affect, and behaviour
- to examine evidence for and against distorted automatic thoughts
- to substitute more reality-oriented interpretations
- to learn to identify and alter dysfunctional schemata

Cognitive Analytic Therapy (CAT)

- developed by Anthony Ryle (1990)
- proposes three essential patterns of what he calls *neurotic repetitions*
    1. *traps* – negative assumptions generate acts which produce consequences which reinforce the assumptions
    2. *dilemmas*
    3. *snags* – appropriate goals are abandoned because of false assumptions
- one of the key concepts is the procedural sequence model (PSM)
- usually takes 10-12 sessions
- a goodbye letter is usually written